

Central Valley Regional Water Quality Control Board

13 January 2016

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US EPA Region 9
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REVIEW OF ALON BAKERSFIELD PROPERTY, INC. (ALON) AQUIFER EXEMPTION APPLICATION FOR CLASS I WASTE WATER DISPOSAL INTO THE LOWER SANTA MARGARITA FORMATION WITHIN THE FRUITVALE OIL FIELD, KERN COUNTY, CALIFORNIA

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff, have reviewed the Alon Bakersfield Property, Inc. application (Application) for Aquifer Exemption for Class I waste water disposal into the Santa Margarita Formation within the Fruitvale Oil Field, Kern County, California. Central Valley Water Board staff identified a variety of concerns regarding the accuracy and/or the completeness of the information provided in the Application. Specific concerns are detailed in the enclosed staff memorandum.

If you have any questions, please contact Alan Cregan at (559) 445-6185 or by e-mail at Alan.Cregan@waterboards.ca.gov.



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Central Valley Regional Water Quality Control Board

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DATE: 13 January 2016

SUBJECT: **REVIEW OF ALON BAKERSFIELD PROPERTY, INC. (ALON) AQUIFER EXEMPTION APPLICATION FOR CLASS I WASTE WATER DISPOSAL INTO THE LOWER SANTA MARGARITA FORMATION WITHIN THE FRUITVALE OIL FIELD, KERN COUNTY, CALIFORNIA**

Alon Bakersfield Property, Inc. (Alon or Facility) submitted a request to the United States Environmental Protection Agency (EPA) for an Aquifer Exemption for Class I waste water disposal into the Santa Margarita Formation within the Fruitvale Oil Field, Kern County, California. The Aquifer Exemption Application (Application) was prepared for Alon by EnviroTech Consultants, Inc. (EnviroTech).

EPA has provided copies of the Application and their Class I Aquifer Exemption Request Completeness Check form (Completeness form) to the Central Valley Regional Water Quality Control Board (Central Valley Water Board) and requested that Central Valley Water Board staff (Staff) provide comments on the proposed project. Staff have reviewed the Application and Completeness form and identified a variety of concerns regarding the accuracy and/or the completeness of the information provided in the Application. Staff's concerns are detailed in the following items.

Item 1: The discussion of the aquifer or portion of the aquifer that is to be exempted requires clarification. It is unclear what is meant by "lower Santa Margarita formation." Geophysical logs for Alon's injection wells WD-1, WD-2, and WD-3 show multiple sands in the upper Santa Margarita, with the base of the lowermost sand marked on each log as the "E Sand". The Application provides no discussion or stratigraphic correlation regarding the position/depth of the E Sand relative to the top of the lower Santa Margarita formation.

The Application needs to include a table that provides the depths and elevations for the Etchegoin, Fairhaven, Mason-Parker, Martin, Upper Kernco, Middle Kernco, Lower Kernco, Santa Margarita, and Lower Santa Margarita in each of Alon's injection wells and for those oil field injection wells within 1 mile of the Facility.

Item 2: The areal extent of the proposed exemption extends approximately one mile to the south-southwest beyond the administrative boundary of the Fruitvale Oil Field. The Application; however, provides no discussion or rationale regarding the need for expansion beyond the current administrative boundary.

Item 3: The discussion of the total dissolved solids (TDS) concentrations of groundwater within the proposed exemption zone needs to be revised. The TDS value for Red Ribbon WD-1 that is reported on Table 6-1 as 5,630 milligrams per liter (mg/L) is incorrect. The value reported on the certified analytical results (2006) that are contained in Appendix I. is actually 2, 700 mg/L. The 5,630 mg/L TDS value that is currently reported on Table 6-1 appears to be from 1986, which is before the injection well was deepened into the lower Santa Margarita formation.

Additionally, the Application contains no discussion of the water sample collected on January 26, 1989 from formational fluid within the Santa Margarita formation during re-perforation of Texaco's Red Ribbon WD-1. This sample, collected from depths of 4875 to 5075 feet, had a TDS value of 2770 mg/L (data from *Big West of California, LLC Bakersfield, California Permit Application Class I Injection Wells, June 2006*).

Item 4: A portion of the discussion of the Facility's groundwater monitoring wells contained within the Application is incorrect. The document states, "There are currently 487 groundwater monitoring wells completed in a shallow perched aquifer located in and near the refinery used to evaluate water quality that are either gauged and/or sampled on a quarterly or semiannual basis."

According to the, *Third Quarter 2015 Groundwater Monitoring Report Bakersfield Refinery, Bakersfield, California* report prepared by AECOM (October 30, 2015) for the Facility (page 1-2),

"Groundwater at the Site is present primarily in unconfined conditions. While fine-grained units are locally present, available information indicates such units are not laterally continuous, and do not pose significant barriers to the vertical movement of groundwater and COCs beneath the site."

Shallow groundwater beneath the facility is not perched.

Item 5: No information is provided regarding the potential direction of groundwater flow within the lower Santa Margarita formation. According to AECOM's October 30, 2015 report for the Facility, shallow groundwater flow (up to a depth of 200 feet or more below site grade) is to the southwest. It is unknown if the shallow groundwater flow direction is the same or similar in the lower Santa Margarita, or if flow is along the strike of the bedding, or down dip of the formation.

Item 6: The discussion concerning containment of the injected waste water within the lower Santa Margarita formation needs to be revised and expanded. The confining zone described in the fifth paragraph in section 5.0 of the application is at or near the top of the Santa Margarita formation, approximately 4,350 feet below ground surface (bgs); however, the exemption application is for the "lower" Santa Margarita below the E Sand (approximately 5,500 feet bsg). Additionally, lateral, down-dip containment is not demonstrated nor can it be evaluated based upon the information presented in the Application (Application geologic/boundary maps do not extend far enough down gradient to the south and southwest).

Item 7: The table of inventoried water wells with owner information, purpose, depth, name of aquifer, well completion, age, and data source provided in Attachment D and on Table 2-1 is incomplete. There is a large number of water wells (including domestic supply wells) situated within a one mile radius of the Facility that are not shown on the Water Well Survey or included on the table of water well construction logs. Consequently the depths of these wells have not been evaluated.

Item 8: Additional comments/concerns include the following:

- A. The discussion regarding the TDS groundwater concentrations contained within the Executive Summary and in the body of the document may need to be revised based upon the concentrations contained in Appendix I. (see the discussion of **item 3** above);
- B. Section 3.0 will need to be revised following an expanded review of area water supply wells. Section 8.1 may also require revision depending upon the results of the water well survey.
- C. A significant portion of the information identified as "Not provided" or "Incomplete" by EPA's Completeness form (e.g., permeability and porosity are not provided) are included in previous permit applications for Class 1 Injection Wells submitted by Big West of California, LLC, the precursor of Alon (e.g., January 2008). This information is available in the files of Central Valley Water Board's, Fresno Office and are available for public review.